Heat Pipes

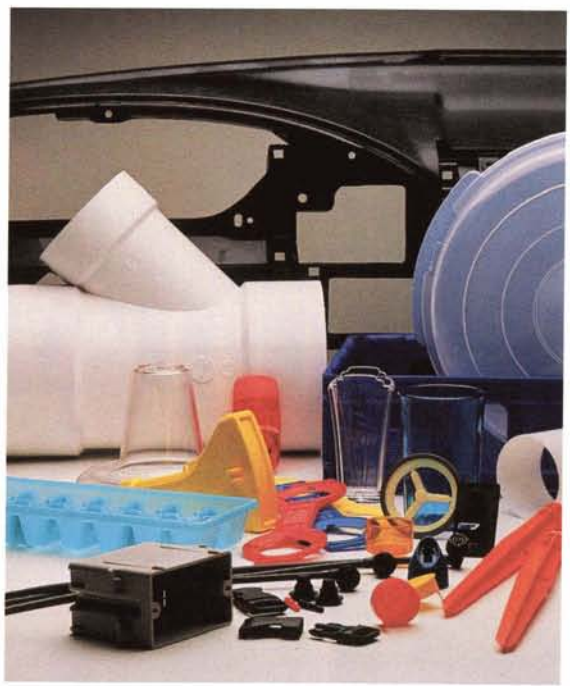
In the early days of space flight, NASA solved a major problem by teaming with Los Alamos Scientific Laboratory (LASL) in development of the heat pipe. The problem was that the Sun-facing surfaces of a non-rotating satellite became very hot while surfaces not exposed to the Sun became extremely cold, a temperature differential that threatened failure of electronic systems. The solution, used in virtually all spacecraft since its development, was the heat pipe, a tubular device in which a working fluid alternately evaporates and condenses, transferring heat from one region of the tube to another without external help.

This simple device offered a very broad range of practical Earth applications and NASA prompted its broadest use by refining the technology and working with a number of other organizations on technology demonstrations. Heat pipe technology has become one of the most frequently tapped sources of spinoff applications. Some of the early users have further advanced the technology and broadened the range of applications through several generations of product development.

Hot runner nozzles provide the consistent temperatures needed to make uniform parts.

Among the latter is KONA Corporation, Gloucester, Massachusetts, a company formed in 1978 to manufacture hot runner systems for the plastics injection molding industry, using heat pipe technology that offered significant manufacturing and maintenance economies. KONA operated initially under a license from James M. Stewart, an independent consultant to the plastic industry, who had used the NASA/LASL technology as a departure point for his own development of patented "heat tubes."

KONA has continued to use the NASA technology as an integral part of its manufacturing equipment for such products as camera parts, kitchenware, auto components, TV cabinets and telephone parts. KONA has refined the technology through three generations of heat pipe advancement. The first was the KONA Nozzle, a heaterless injection nozzle designed to fit all injection molding systems; it was followed by a complete line of Hot Sprue Bushings. KONA also applies heat pipe technology to the company's Hot Runner Systems.



Hot runner systems are used for production of a wide range of plastic products, from ice trays to medical devices.

Temperature uniformity is critical in hot runner molding and the heat pipe, KONA says, is a way of getting it with multiple advantages over alternative systems. By offering a wide selection of hot runner nozzles and tips, KONA gives mold designers and moldmakers exceptional flexibility. KONA Hot Runner Systems are used throughout the plastics industry in the manufacture of products ranging in size from tiny medical devices to large single cavity auto bumpers and instrument panels. Sales of Hot Runner Systems account for 75 percent of all KONA sales.